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PATENT
Docket No. SJO920000065US1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Vladimir Nikitin et al.	
Serial No.:	10/087,332	
Filed:	March 1, 2002	Group Art Unit: 2652
For:	**REDUCTION OF INTERFERENCE PICKUP IN HEADS FOR MAGNETIC RECORDING BY MINIMIZING PARASITIC CAPACITANCE**	
Examiner:	Davis, David Donald	

APPELLANTS' SUPPLEMENTAL APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The USPTO received Appellants' timely Appeal Brief on February 22, 2005 and Notice of Appeal on June 25, 2004. The Notice of Appeal was filed in response to the Final Office Action mailed March 24, 2004. In response to the Appeal Brief, the Examiner reopened prosecution and issued a Final Office Action mailed May 18, 2005. The Final Office Action included a new ground of rejection, but was not necessitated by an amendment or based on an information disclosure statement. Based on the Final Office Action and the Examiner's reliance on 37 C.F.R. §1.193(b)(2), Appellants considered the reopened prosecution and Final Office

Action a written statement in answer to Appellant's brief (an Examiner's answer) under 37 C.F.R. §1.193(b)(2) and 37 C.F.R. §41.39. Therefore, Appellant filed a supplemental appeal brief in compliance with 37 CFR 41.39(b)(2) on June 30, 2005. Appellants contended that reopening prosecution is an unnecessary waste of time and money, and that making the first action final based on a new ground of rejection is improper. Appellants reiterated all of the applicable arguments presented in Appellants Appeal Brief of February 22, 2005.

In response to a status request filed March 23, 2006, Appellants received a notice of non-compliant appeal brief because the supplemental appeal brief was inadvertently filed without a signature and because the new rule changes required filing of a new appeal brief and new notice of appeal. Consequently, Appellants filed a new appeal brief with an accompanying notice of appeal.

The USPTO received Appellants' timely Appeal Brief and Notice of Appeal on November 17, 2006. In response, the Examiner issued an Office Action mailed February 22, 2007. The Office Action did not state that the Examiner was reopening prosecution; therefore, Appellants presume that the Office Action was intended as an Examiner's Answer to the Appeal Brief filed on November 17, 2006 under 37 C.F.R. §1.193(b)(2) and 37 C.F.R. §41.39. Appellants again submit that reopening prosecution is an unnecessary waste of time and money.

The Examiner's Answer again included a new ground of rejection based on a newly cited piece of art, in spite of the direction in the MPEP that "New grounds of rejection in an examiner's answer are envisioned to be rare, rather than a routine occurrence." (MPEP 1207.03). Consequently, Appellants filed a new Appeal Brief on April 23, 2007, reiterating applicable arguments of previous Appeal Briefs and addressing new grounds of rejection below in Section 7 as set forth in 37 C.F.R. §41.37(c)(1)(vii). On June 4, 2007 the Patent Office mailed a Notification of Non-Compliant Appeal Brief and gave one month to respond. The revised Appeal Brief, which Appellants filed on July 5, 2007, responded by stating which claims are under appeal as required by 37 C.F.R. § 41.37(c)(1)(iii).

The USPTO issued a Notification of Non-Compliance mailed Oct. 9, 2007 indicating that Appellants had not presented an argument under a separate heading for each ground of rejection on appeal (37 C.F.R. §41.37(c)(1)(vii)). The Applicants responded, filing a revised Appeal Brief on November 9, 2007, correcting the non-compliance problems noted in the Notification of Non-

Compliance. In particular, arguments for issues that were previously incorporated by reference were explicitly included.

The USPTO issued a Notification of Non-Compliance mailed Feb. 5, 2008 indicating that Appellants' brief does not include a correct statement of each ground for rejection presented for review in light of the action mailed February 22, 2007 and does not present a commensurate argument for each ground of rejection in light of the action mailed February 22, 2007. The Appellants filed a Supplemental Appeal Brief on April 7, 2008, correcting the non-compliance problems noted in the Notification of Non-Compliance. In particular, arguments for issues that were previously incorporated by reference were explicitly included.

In response, the Examiner issued an Office Action mailed June 30, 2008, as an Examiner's Answer to the Appeal Brief filed on November 17, 2006 under 37 C.F.R. §1.193(b)(2) and 37 C.F.R. §41.39. Appellants again submit that reopening prosecution is an unnecessary waste of time and money.

The Examiner's Answer again included a new ground of rejection, this time under 35 U.S.C. § 112, in spite of the direction in the MPEP that "New grounds of rejection in an examiner's answer are envisioned to be rare, rather than a routine occurrence." (MPEP 1207.03). Appellants address this new ground of rejection in section 7 below, Arguments. Appellants again respectfully request the reinstatement of the appeal. The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or to credit any overpayment, to Deposit Account No. 09-0466.

1. REAL PARTY IN INTEREST

The real party in interest is the assignee, International Business Machines Corporation, Armonk, New York.

2. RELATED APPEALS AND INTERFERENCES

Other than the Appeal Briefs filed February 22, 2005, November 17, 2006, and April 7, 2008 in the present case, there are no related appeals or interferences.

3. STATUS OF CLAIMS

The Applicants respectfully appeal the rejection of Claims 1-25. The Final Office Action mailed March 24, 2004 rejected Claims 1-25 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,807,073 to Takeura et al. (hereinafter "Takeura") in view of U.S. Patent No. 5,048,175 to Jurisch et al. (hereinafter "Jurisch"). Given that the Examiner failed to cite Takeura and Jurisch in the new Office Action mailed February 22, 2007, Appellants consider these rejections withdrawn. Nevertheless, to the extent that the Examiner might argue that these rejections are still relevant, Appellants maintain and incorporate by reference the arguments presented in the Appellant's Appeal Brief of February 22, 2005.

The second Final Office Action mailed May 18, 2005 issued a new ground of rejection in response to the Appeal Brief filed on February 22, 2005. The second Final Office Action rejected Claims 1-3, 5-7, 14, 16, and 23-25 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,966,800 to Huai et al. (hereinafter "Huai") and also rejected Claims 4, 8-13, 15, and 17-22 under 35 U.S.C. § 103(a) as obvious in view of Huai. Given that the Examiner failed to cite Huai in relation to rejections under 35 U.S.C. § 102(b) or as a sole ground of rejection under 35 U.S.C. § 103(a), Appellants consider these rejections withdrawn. Nevertheless, to the extent that the Examiner might argue that these rejections are still relevant, Appellants maintain and incorporate by reference the arguments presented in the Appellant's Appeal Brief of November 17, 2006.

The third Office Action mailed on February 22, 2007 issued a new ground of rejection in response to the Appeal Brief filed on November 27, 2006. The third Office Action rejected Claims 1-5, 8, 14, 16, and 23-25 under 35 U.S.C. §102(b) as being unpatentable over U.S. Patent

No. 5,805,390 to Takeura (hereinafter "Takeura II"), also rejected Claims 6 and 7 under 35 U.S.C. §103(a) as being unpatentable over Takeura II in view of Huai, and also rejected Claims 9-13, 15, and 17-22 under 35 U.S.C. §103(a) as being unpatentable over Takeura II.

The new Office Action mailed June 30, 2008 repeated the rejections of the Office Action mailed on February 22, 2007, and further issued a new ground of rejection in response to the Appeal Brief filed on April 7, 2008. In addition to the repeated rejections from the third Office Action, the new Office Action rejected Claims 15 and 22 under 45 U.S.C. § 112, as failing to comply with the enablement requirement.

4. STATUS OF AMENDMENTS

Appellants filed an amendment subsequent to receipt of the final rejection mailed March 24, 2004. The amendment was entered for purposes of this appeal, as noted in the Advisory Action mailed June 16, 2004. A copy of the claims is included in Section 9, Claims Appendix.

In the Appeal Brief received by the USPTO February 22, 2005, Appellants proposed an amendment to claim 15 to replace "~~Further comprising an~~ electrical contact ~~having~~" with "wherein the electrical contact pad has." This amendment was proposed to address readability of the preamble and antecedent basis agreement with Claim 1, but was apparently not entered. However, since this proposed amendment is now not permitted under 37 C.F.R. 41.39(b)(2) or 37 C.F.R. 41.37(c), Appellants have removed the proposed amendment and request that the informality relating to antecedent basis be addressed once Claim 15 is allowed.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Magnetoresistive (MR) and giant magnetoresistive (GMR) heads used in data storage drives may be subject to interference noise. This noise may reduce the quality of the data read from a tape storage device or a hard disk drive. As the interference noise increases, the signal-to-noise ratio (SNR) decreases and the quality of the detected read signal decreases. *See*, Background, pages 1-2. The interference noise may be due, at least in part, to ambient radio frequency (RF) energy, which may originate from external (e.g., radio and/or television station broadcasts) or internal (e.g., storage drive motors and/or electronics) sources. Summary, page 4,

lines 7-15. Various embodiment disclosed in the present application reduce the effects of interference noise by reducing the capacitance of various head elements within a storage drive. Summary, page 4, lines 16-19.

One embodiment includes a magnetic head 600 having a material 602, which has a low dielectric constant, interposed between a substrate 614 and an electrical contact pad 610. The electrical contact pads 610 are the read and write elements through which a storage drive reads and writes data to/from the storage device. The low dielectric material 602 reduces the parasitic capacitive coupling between the substrate 614 and the contact pad 610, thereby improving the quality of the signal at the contact pad 610. Detailed Description, page 10, line 26 through page 11, line 12. In particular, independent Claim 1 recites an electrical contact pad, a substrate, an insulating undercoat, and a low dielectric material. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 1. The substrate 614 (See Fig. 6, Specification page 10, lines 9-13) represents one example of the substrate recited in Claim 1. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating undercoat recited in Claim 1. The low dielectric material 602 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the low dielectric material recited in Claim 1.

The following quotation of Claim 1 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 1 in compliance with 37 CFR 41.37(c)(1)(v).

1. A magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9);

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) is formed;

an insulating undercoat (See Fig. 6, element 608, Specification page 10, lines 23-25) interposed between the pad and the substrate; and

a material (See Fig. 6, element 602, Specification page 10, line 26- page 11, line 8) selected to have a low dielectric constant interposed between the pad and the insulating undercoat.

Another embodiment includes a reduced capacitance magnetic head 600 having a contact pad, a substrate, a conducting layer, a low dielectric material, and a conducting stud. Detailed

Description, page 10, lines 5-14. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 16. The substrate 614 (See Fig. 6, Specification page 10, lines 9-13) represents one example of the substrate recited in Claim 16. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating layer recited in Claim 16. The low dielectric material 602 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the low dielectric material recited in Claim 16. The stud 604 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the conducting stud recited in Claim 16.

The following quotation of Claim 16 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 16 in compliance with 37 CFR 41.37(c)(1)(v).

16. A reduced capacitance magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:
an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9);
a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;
an insulating layer (See Fig. 6, element 608, Specification page 10, lines 23-25) formed over the substrate;
a low dielectric material (See Fig. 6, element 602, Specification page 10, line 26-page 11, line 8) interposed between the pad and the substrate which is used as a platform for the electrical contact pad to increase the distance between the substrate and the electrical contact pad, the low dielectric material comprising hard bake photo resist (See Fig. 6, Specification page 10, lines 8-9, page 11, lines 8-12) and having a thickness of about 20 μm and a dielectric constant of about 3; and
a conducting stud (See Fig. 6, element 604, Specification page 10, lines 9-14) formed through the low dielectric material to make electrical connection between the electrical contact pad and the insulating layer.

Another embodiment includes a disk drive system that includes a reduced capacitance magnetic head 600 having a contact pad, a substrate, a low dielectric material, a magnetic recording disk, a spin-valve sensor, and a detector. Detailed Description, page 7, lines 2-6, page 10, lines 5-14. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 17. The substrate 614 (See Fig. 6, Specification page 10, lines 9-13) represents one example of the substrate recited in Claim

17. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating layer recited in Claim 17. The low dielectric material 602 (See Fig. 6, Specification page 10, line 26- page 11, line 8) represents one example of the low dielectric material recited in Claim 17. The magnetic recording disk 104 (See Fig. 1, Specification page 7, lines 2-4) represents one example of the magnetic recording disk. The spin-valve sensor, actuator, and detector are known in the art.

The following quotation of Claim 17 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 17 in compliance with 37 CFR 41.37(c)(1)(v).

> 17. A disk drive system comprising a reduced capacitance magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:
>
> an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9);
>
> a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;
>
> an insulating undercoat (See Fig. 6, element 608, Specification page 10, lines 23-25) interposed between the pad and the substrate;
>
> a material (See Fig. 6, element 602, Specification page 10, line 26- page 11, line 8) selected to have a low dielectric constant interposed between the pad and the insulating undercoat;
>
> a magnetic recording disk (See Fig. 1, element 104, Specification page 7, lines 2-4);
>
> a spin-valve sensor for reading data recorded on the recording disk; and
>
> an actuator for moving the spin valve sensor across the magnetic recording disk in order for the spin-valve sensor to access different magnetically recorded data on the magnetic recording disk; and
>
> a detector electrically coupled to the spin-valve sensor and configured to detect changes in resistance of the sensor caused by rotation of the magnetization of the sensing layer relative to the fixed magnetizations of the pinned layer in response to changing magnetic fields induced by the magnetically recorded data.

Another embodiment includes a magnetic head 600 having a contact pad 610 of a reduced size. The reduced surface area of the contact pad 610 minimizes the parasitic capacitance between the substrate 614 and the contact pad 610. Detailed Description, page 10, lines 5-14. In particular, Claim 22 recites a substrate and a contact pad of reduced surface area. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one example of the substrate recited

in Claim 22. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 22.

The following quotation of Claim 22 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 22 in compliance with 37 CFR 41.37(c)(1)(v).

22. A reduced capacitance magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;

an contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9) disposed above the substrate and having a surface area of less than about 20 μm in order to reduce capacitance coupling with the substrate.

Another embodiment includes a magnetic head 600 having a substrate, an alumina undercoat layer, a contact pad, and a layer of alumina between the electrical contact pad and the alumina undercoat layer. Detailed Description, page 10, lines 5-14. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one example of the substrate recited in Claim 23. The undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the alumina undercoat layer recited in Claim 23. The layer of alumina interposed between the electrical contact pad and the alumina undercoat layer recite in Claim 23 represent one example of "a manner of achieving a greater separation between the contact pads 610 and the substrate material 614..." (See Fig. 6, Specification page 10, lines 17-18).

The following quotation of Claim 23 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 23 in compliance with 37 CFR 41.37(c)(1)(v).

23. A magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;

an alumina undercoat layer comprising Al_2O_3 formed over the substrate;

an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9); and

a layer of alumina interposed between the electrical contact pad and the alumina undercoat layer.

Another embodiment includes a magnetic head 600 having a contact pad 610 that is separated from the substrate 614 by an insulating undercoat 608 of increased thickness. Detailed

Description, page 10, lines 15-22. In particular, Claim 24 recites a substrate, an insulating undercoat layer, an electrical contact pad, and another layer of SiO2. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one embodiment of the substrate recited in Claim 24. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of the insulating undercoat layer and the additional layer of SiO2 recited in Claim 24. The electrical contact pad 610 (See Fig. 6, Specification page 10, lines 5-8) represents one example of the electrical contact pad recited in Claim 24.

The following quotation of Claim 24 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 24 in compliance with 37 CFR 41.37(c)(1)(v).

24. A magnetic head (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19) on which the magnetic head is formed;

an alumina undercoat layer comprising SiO_2 formed over the substrate;

an electrical contact pad (See Fig. 6, element 610, Specification page 10, lines 5-9); and

a layer of alumina interposed between the electrical contact pad and the alumina undercoat layer.

Another embodiment includes a method of reducing capacitance in a magnetic head 600 by isolating the read/write head from the substrate to reduce capacitance coupling. Detailed Description, page 10, lines 15-22. In particular, Claim 25 recites providing a substrate and a read/write head and isolating the read/write head from the substrate to reduce capacitance coupling. The substrate 614 (See Fig. 6, Specification page 10, lines 9-14) represents one example of a substrate provided in Claim 25. The read contact layers 218 and write contact layers 206 (See Fig. 6, Specification page 7, lines 19-24) represents one example of the read/write head recited in Claim 25. The insulating undercoat 608 (See Fig. 6, Specification page 10, lines 15-25) represents one example of isolating the read/write head from the substrate recited in Claim 25.

The following quotation of Claim 25 includes reference numerals and parenthetical references to representative examples of the elements and components recited in Claim 25 in compliance with 37 CFR 41.37(c)(1)(v).

25. A method for reducing capacitance in a magnetic head, (See Fig. 6, element 600, Specification page 10, lines 1-2) comprising:

providing a substrate (See Fig. 6, element 614, Specification page 10, lines 15-19);

providing a read/write head (See Fig. 6, elements 218 and 206 Specification page 7, lines 19-24); and

isolating (See Fig. 6, element 206 Specification page 10, lines 15-25) the read/write head from the substrate in order to reduce the capacitance coupling between the read head and the substrate.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Issues I, II, and III address the rejections raised in the third Office Action mailed on February 22, 2007, and repeated in the new Office Action of June 30, 2008. Issue IV addresses the new rejection raised in the new Office Action of June 30, 2008.

I. Whether the Examiner failed to establish a *prima facie* case of anticipation under 35 U.S.C. § 102(b) for claims 1-5, 8, 14, 16 and 23-25 based on Takeura II where the limitations of the claims are not taught by the cited reference?

II. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 6 and 7 based on Takeura II and Huai where the limitations of the claims are not taught or suggested within the combination of cited references?

III. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 9-13, 15, and 17-22 based on Takeura II where the limitations of the claims are not taught or suggested within the cited reference?

IV. Whether the Examiner failed to establish a case of lack of enablement under 35 U.S.C. § 112 for claims 15 and 22 where the scope of the range of the claims is reasonably enabled by the Specification?

7. ARGUMENT

I. The Examiner failed to establish a *prima facie* case of obviousness because the cited references, either alone or in combination, do not teach or suggest all of the limitations of Claims 1-5, 8, 14, 16, and 23-25.

Appellants respectfully assert that Takeura II fails to teach or suggest the low dielectric material (or material selected to have a low dielectric, or species thereof) claimed in independent Claims 1, 16, 17, 23, 24, and 25 of the present application. Applicants submit that discussion of merits of patentability for one of these independent claims applies to the other independent claims having substantially the same subject matter.

The Office Action dated June 30, 2008 asserts that material 18 Alumina of Takeura II is a low dielectric material configured to decrease parasitic capacitance of the magnetic head. Applicants disagree.

Appellants respectfully assert that Takeura II fails to teach or suggest all the elements of independent Claims 1, 16, and 24. Specifically, Takeura II fails to teach or suggest a low dielectric material interposed between the pad and the substrate and/or insulating undercoat as recited in the claims. Also, Takeura II fails to teach or suggest an insulating undercoat layer as recited in the claims.

A. The Low Dielectric Material

CLAIM 1

Claim 1 recites a material having a low dielectric constant interposed between the pad and the insulating undercoat. The Examiner asserts that the low dielectric material is "Material 18, alumina" (Office Action, Page 3, Paragraph 3). Takeura II describes the same structure as "an alumina film formed as a protective film 18" (Takeura II, Column 9, Lines 61-62). The Examiner points to Figures 5A-5C and Col. 9, l. 56- Col. 10, l. 6. Appellants take no issue with the Examiner's characterization of an electrical contact pad 30, 31, 32, or 33 or substrate 4. However, Appellants disagree that a protective alumina film 18 constitutes an insulating undercoat or a material having a low dielectric constant interposed between the pad and the insulating undercoat.

Close review of Figures 5A-5C and the description indicates that alumina film is above the substrate and surrounds the pad. In fact, alumina film is removed in Takeura II. See Col. 9, lines 64-67. However, there is no teaching in Takeura II that the alumina film have a low dielectric constant. Those in the art recognize that "dielectric constant" means "A measure of a material's ability to store electrical energy." See http://smt.pennnet.com/Articles/Article_Display.cfm?Section=OnlineArticles&SubSection=Display&PUBLICATION_ID=35&ARTICLE_ID=99807 – under term dielectric constant. Included as Evidence1.pdf. Appellants submit that there is no teaching in Takeura II that the alumina film have a low dielectric constant. Takeura II is silent on dielectric constant. Therefore, Appellants submit that Takeura II fails to teach each element of Claim 1 as recited.

Furthermore, Claim 1 requires that the material with a low dielectric constant be interposed between the pad and the insulating undercoat. The terms "interposed" and "between" are to be given their plain meaning. See dictionary.com definition, Evidence2.pdf. Consequently, Claim 1 requires that the alumina film of Takeura II sit in "the space separating" the undercoat 16 and the pad 30. This meaning of the term "between" is highlighted by the term "interposed." Appellants agree that undercoat 16 is interposed between the pad 30 and the substrate 4. However, Appellants submit that the alumina film is not in the space separating the undercoat 16 and the pad 30.

Appellants note that the undercoat 16 is a layer coming completely between the pad 30 and the substrate 4. However, the film 18 does not extend as a layer between the pad 30 and the undercoat 16. Instead, structures 19, 12', 11', and 10' sit between the pad 30 and the undercoat 16. At best, the film is in a space above the undercoat 16 and below the pad. By being interposed between the pad and the substrate, the material of Claim 1, because of its low dielectric constant, reduces parasitic capacitances between the pad and the substrate, a benefit that is not accomplished with the positioning of the alumina film of Takeura II. Since the structure 18 is not interposed between the undercoat 16 and the pad 30, the Examiner has not established the limitation recited in Claim 1 and Takeura II does not anticipate independent Claim 1.

CLAIM 16

Claim 16 recites a low dielectric material comprising hard bake photo resist. The Examiner does not assert that Takeura II teaches or suggests the use of hard bake photo resist as a low dielectric material. On the contrary, the structure in Takeura II that the Examiner correlates with the low dielectric material is described by the Examiner as "Material 18, alumina" (Office Action, Page 3, Paragraph 3). Takeura II describes the same structure as "an alumina film formed as a protective film 18" (Takeura II, Column 9, Lines 61-62). Since the structure referenced by the Examiner as a low dielectric material is clearly described as alumina rather than hard bake photo resist, the Examiner has not established a limitation recited in the claim, Takeura II does not anticipate independent Claim 16.

Furthermore, or in the alternative, Claim 16 recites a low dielectric material interposed between the pad and the substrate having a thickness of 20 μm. The Examiner does not assert that Takeura II teaches or suggests a low dielectric material interposed between the pad and the substrate having a thickness of 20 μm. As described above, the Examiner has asserted that structure 18 in Takeura II correlates with the low dielectric material. Takeura II describes structure 18 as having a thickness of 60 μm (Takeura II, Column 9, line 62). Since the structure referenced by the Examiner as a low dielectric material is clearly described as having a thickness of three times the thickness recited in the claims, the Examiner has not established a limitation recited in the claim. Therefore, Takeura II does not anticipate independent Claim 16.

In addition, or in the alternative, Claim 16 recites a low dielectric material interposed between the pad and the substrate having a dielectric constant of about 3. The Examiner does not assert that Takeura II teaches or suggests a low dielectric material interposed between the pad and the substrate having a dielectric constant of about 3. As described above, Takeura II describes structure 18 as comprising alumina. Alumina has a dielectric constant of about 10 (see, http://www.matweb.com/search/SpecificMaterial.asp?bassnum=BA1A), See Evidence3.pdf. Since the structure referenced by the Examiner as a low dielectric material is clearly described as alumina, which has a dielectric constant of more than three times the dielectric constant recited in the claim, the Examiner has not established a limitation recited in the claim. Therefore, Takeura II does not anticipate independent Claim 16.

CLAIM 24

Claim 24 recites a layer of SiO2 interposed between the electrical contact pad and the insulating undercoat layer. The Examiner does not assert that Takeura II teaches or suggests recites a layer of SiO2 interposed between the electrical contact pad and the insulating undercoat layer. Since the Examiner has not established a limitation recited in the claim, Takeura II does not anticipate independent Claim 24.

Accordingly, the Office Action fails to establish a *prima facie* case of anticipation because Takeura II fails to teach each and every element of Claims 16 and 24, Appellant respectfully submits that independent Claims 16 and 24 are patentable over the cited reference. Consequently, Appellant requests that the rejection of Claims 16 and 24 under 35 U.S.C. § 102(b) be withdrawn.

B. The Insulating Undercoat Layer

Claim 24 recites an insulating undercoat layer comprising SiO2 formed over the substrate. The Examiner does not assert that Takeura II teaches or suggests the use of insulating undercoat layer comprising SiO2. On the contrary, the structure in Takeura II that the Examiner correlates with the insulating undercoat layer is described by the Examiner as "an insulating alumina undercoat 16" (Office Action, Page 3, Paragraph 2). Since the structure referenced by the Examiner as an insulating undercoat layer is clearly described as alumina rather than SiO2, the Examiner has not established a limitation recited in the claim, Takeura II does not anticipate independent Claim 24.

Accordingly, the Office Action fails to establish a *prima facie* case of anticipation because Takeura II fails to teach each and every element of Claim 24, Appellant respectfully submits that independent Claim 24 is patentable over the cited reference. Consequently, Appellant requests that the rejection of Claim 24 under 35 U.S.C. § 102(b) be withdrawn.

Claims 2-5, 8, and 14 depend from allowable independent claims and are allowable at least for the reasons set forth above.

II. The Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 6 and 7 where the limitations of the claims are not taught or suggested within the combination of cited references.

Appellants respectfully assert that that Takeura in view of Huai fails to teach or suggest all the elements of Claims 6 and 7. Specifically, Takeura II and Huai fail to teach or suggest all the elements of Claims 6 and 7. Furthermore, if, *arguendo*, Takeura II and Huai do include the elements of Claims 6 and 7, the Office Action impermissibly uses hindsight to combine the references.

CLAIMS 6 AND 7

Claims 6 and 7 recite a low dielectric material comprising hard-bake photo resist and SiO2, respectively. Both claims depend from Claim 1, which defines the low dielectric material as being "interposed between the pad and the insulating undercoat." As the Office Action states, "Takeura [II], however, is silent as to the low dielectric material being either hard bake photo resist or SiO2." (Office Action, Page 4, Paragraph 4).

The Office Action states that Huai discloses "the low dielectric material 60 & 66 can be substitute [sic] with a hard bake photo resist. Column 5, lines 53-57 Huai et al [sic] discloses that the low dielectric material includes SiO_2." (Office Action, Page 4, Paragraph 5). The Office Action goes on to state that the substitution of alumina for either SiO_2 or hard bake photo resist would have been obvious "because the materials are art recognized equivalents." (Office Action, Page 5, first partial paragraph).

The Examiner appears to improperly take Official Notice of this assertion, but fails to comply with the requirements for Official Notice. Specifically, the assertion is not shown to be well known or common knowledge in the art, and the brief, conclusory statement fails to provide a clear and unmistakable technical line of reasoning as required by MPEP § 2144.04. If the Examiner maintains this assertion, Appellant requests that the Examiner provide evidence to show that modifying low dielectric material in Takeura II to comprise SiO_2 or hard bake photo resist for a low dielectric material interposed between the pad and the insulating undercoat was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood to have

improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

As described in Appellants' application, the various materials used as exemplary for the low dielectric material have a different dielectric constant, and the use of a material with a different dielectric constant impacts the amount of high frequency interference picked up by the magnetic head. Selection of a material with a particular dielectric constant, therefore, impacts the other aspects of the design of the magnetic head, such as the optimal thickness of various components. (Published Application, Publication No. 2003/0165034, paragraphs 0037-0039). Materials with differing dielectric constants are therefore not equivalent.

In addition, the Office Action mischaracterizes the motivation for selecting a low dielectric material. As stated in the Appeal Brief of November 11, 2006, structures 60 and 66 of Huai are in a different location in relation to other components, and serve a different purpose than the low dielectric material of Claims 6 and 7. Specifically, structure 60 in Huai is on the side of an electrical feedthrough 36, and interposed between the dielectric material 66 and a protective layer 56. Structure 66 is situated between layers of a coil. None of these configurations can be described as being "interposed between the pad and the insulating undercoat" as described in the claims of Appellants' invention. By describing the use of SiO_2 or hard bake photo resist as a substitute, Huai is disclosing the applicability of these materials for use in insulating a coil, not for use in separating contact pads from a substrate to reduce the high frequency interference picked up by read elements of a magnetic head as disclosed by the Appellants' invention.

The Office Action, Takeura II, and Huai are all silent on the impact the dielectric constant may have on the high frequency interference picked up by read elements of a magnetic head. Absent any suggestion that such a selection may reduce the high frequency interference picked up by read elements of a magnetic head, it would not have been obvious to one of ordinary skill in the art to select a material with a particular dielectric constant for such a purpose. Therefore, it would not have been obvious to one of skill in the art to modify a low dielectric material of Takeura II to comprise SiO_2 or hard bake photo resist.

Accordingly, the Office Action fails to establish a *prima facie* case of obviousness because the cited references fail to teach every element of these claims or show a suggestion or

motivation to combine or modify the cited references. Given that the cited references fail to teach all of the elements recited in Claims 6 and 7, Appellants respectfully submit that Claims 6 and 7 are patentable over the cited references. Consequently, Appellants request that the rejection of Claims 6 and 7 under 35 U.S.C. § 103(a) be withdrawn.

III. Whether the Examiner failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 9-13, 15, and 17-22 where the limitations of the claims are not taught or suggested within the cited reference.

Appellants respectfully assert that Takeura II fails to teach or suggest all the elements of independent Claims 1, 17, and 22 from which Claims 9-13, 15, and 18-21 depend. Specifically, Takeura II fails to teach or suggest the low dielectric material recited in the claims. Furthermore, Takeura II fails to teach or suggest a surface area characteristic of the electrical contact pad as recited in the claims.

A. Low Dielectric Material

CLAIMS 9 and 20

Claims 9 and 20 recite a low dielectric material having a thickness in a range of between about 10 μm and about 50 μm. Claim 10 recites a low dielectric material having a thickness of about 20 μm. All three claims depend from a claim describing the low dielectric material as a material selected to have a low dielectric constant interposed between the pad and the insulating undercoat. As the examiner states, "Takeura [II], however, is silent as to the low dielectric material having a thickness in a range of between 10 μm and about 50 μm; or having a thickness of about 20 μm" (Office Action, Page 5, second full paragraph).

The Office Action fails to provide any motivation to modify a low dielectric material of Takeura II to have a thickness in a range of between 10 μm and about 50 μm or about 20 μm. The Office Action merely states that "one of ordinary skill in the art at the time the invention was made would have been motivated to specify a thickness range . . . which is well within the purview of a skilled artisan and absent an unobvious result, so as to effectively optimize the insulative properties of the dielectric material." (Office Action, Page 5, third full paragraph).

The Examiner appears to improperly take Official Notice of this assertion, but fails to comply with the requirements for Official Notice. Specifically, the assertion is not shown to be

well known or common knowledge in the art, and the brief, conclusory statement fails to provide a clear and unmistakable technical line of reasoning as required by MPEP § 2144.04. If the Examiner maintains this assertion, Appellant requests that the Examiner provide evidence to show that modifying low dielectric material in Takeura II to have a thickness in a range of between about 10 μm and about 50 μm or about 20 μm to "optimize the insulative properties of the dielectric material" was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

In addition, or in the alternative, the Office Action mischaracterizes the motivation for selecting a thickness for the low dielectric material. The purpose is not to "optimize the insulative properties of the dielectric material" as stated by the Office Action. The selection of a thickness is to cause "a reduction in high frequency interference picked up by the read elements" (published application, publication number 2003/0165034, paragraph 0038).

Neither Takeura II nor the Office Action suggest that the selection of a thickness of the low dielectric material may have an impact on the high frequency interference picked up by read elements of a magnetic head. Absent any suggestion that such a selection may reduce the high frequency interference picked up by read elements of a magnetic head, it would not have been obvious to one of ordinary skill in the art to select a thickness for such a purpose. Therefore, it would not have been obvious to one of skill in the art to modify a low dielectric material of Takeura II to have a thickness in a range of between 10 μm and about 50 μm or about 20 μm.

The Office action makes the same argument in relation to Claims 11 and 12. Claims 11 and 12 recite the low dielectric material having a dielectric constant of about 9 or about 3, respectively. Specifically, the Examiner states that "one of ordinary skill in the art at the time the invention was made would have been motivated to specify a . . . dielectric constant, which is well within the purview of a skilled artisan and absent an unobvious result, so as to effectively optimize the insulative properties of the dielectric material." (Office Action, Page 5, third full paragraph).

For the reasons stated above, this argument improperly takes Official Notice of this assertion. If the Examiner maintains this assertion, Appellant requests that the Examiner provide

evidence to show that modifying low dielectric material in Takeura II to have a dielectric constant of about 9 or about 3 to "optimize the insulative properties of the dielectric material" was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

Additionally, or in the alternative, for the reasons stated above, this argument mischaracterizes the motivation for selecting a material having a specific dielectric constant. Neither Takeura II nor the Office Action suggest that the selection of a low dielectric material with a dielectric constant of about 9 or about 3, or indeed, any particular dielectric constant, may have an impact on the high frequency interference picked up by read elements of a magnetic head. Absent any suggestion that such a selection may reduce the high frequency interference picked up by read elements of a magnetic head, it would not have been obvious to one of ordinary skill in the art to select a material for such a purpose. Therefore, it would not have been obvious to one of skill in the art to modify a low dielectric material of Takeura II to have a dielectric constant of about 9 or about 3.

B. Area of the Electrical Contact Pad

With regard to the surface area of the electrical contact pad recited in Claims 15 and 22, the Office Action completely fails to provide any support for the assertion of obviousness. Takeura II is silent as to the surface area of the electrical contact pad and provides no guidance as to the dimensions of an electrical contact pad.

Moreover, the Office Action fails to provide any motivation to modify an electrical contact pad of Takeura II to have a particular surface area. The Office Action merely states that "one of ordinary skill in the art at the time the invention was made would have been motivated to provide a contact pad with a specific surface area to effectively optimize the electrical properties of the contact pad and decrease any unwanted interference" (Office Action, Page 6, first full paragraph).

The Examiner appears to improperly take Official Notice of this assertion, but fails to comply with the requirements for Official Notice. Specifically, the assertion is not shown to be well known or common knowledge in the art, and the brief, conclusory statement fails to provide

a clear and unmistakable technical line of reasoning as required by MPEP § 2144.04. If the Examiner maintains this assertion, Appellant requests that the Examiner provide evidence to show that modifying an electrical contact pad in Takeura II to have a surface area of less than 20 μm to, "optimize the electrical properties of the contact pad and decrease any unwanted interference" was well known or common knowledge in the art at the time of the invention of Appellants. Without the proper evidentiary support for this conclusory assertion, the Examiner is understood to have improperly relied on impermissible hindsight to produce an otherwise unsupported motivation to modify the cited reference.

For the reasons cited above, Takeura II fails to teach or suggest all of the elements recited in Claims 9-12, 15, 20, and 22. In particular Takeura II fails to teach or suggest the recited low dielectric material having the recited thickness or the recited dielectric constant and the surface area characteristic of the electrical contact pad. Accordingly, the Office Action fails to establish a *prima facie* case of obviousness because the cited reference fails to teach every element of these claims or show a suggestion or motivation to modify the cited reference. Given that the cited reference fails to teach all of the elements recited in Claims 9-12, 15, 20, and 22, Appellant respectfully submits that Claims 9-12, 15, 20, and 22 are patentable over the cited reference. Consequently, Appellant requests that the rejection of Claims 9-12, 15, 20, and 22 under 35 U.S.C. § 103(a) be withdrawn.

IV. Whether the Examiner failed to establish a case of lack of enablement under 35 U.S.C. § 112 for claims 15 and 22 where the scope of the range of the claims is reasonably enabled by the Specification.

Appellants respectfully assert that Claims 15 and 22 comply with the enablement requirement. Specifically, the Specification reasonably enables the scope of the range of "the electrical contact pad having a surface area of less than about 20 μm" as recited in the claims at issue. The Office Action suggests that the Specification "does not provide enablement for a surface area up to and approaching zero." (Office Action, Page 2, Paragraph 4). Although no explicit analysis is given in the Office Action, the previous statement infers that the Specification enables all contact pad surface areas less than 20 μm, except contact pad surface areas at or approaching zero, the smallest possible percentage of the range given.

In order to satisfy the enablement requirement of 35 U.S.C. § 112 for a claimed range of values, a specification must reasonably enable the scope of the range. *See*, e.g., MPEP § 2164.08 referencing *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1244, 68 USPQ2d 1280, 1287 (Fed. Cir. 2003) (When a range is claimed, there must be reasonable enablement of the scope of the range). MPEP § 2164.08 goes on to state that "the examiner should determine what each claim recites and what the subject matter is when the claim is considered as a whole, not when its parts are analyzed individually."

Appellants respectfully submit that paragraph 36 of the Specification enables minimizing the surface area of electrical contact pads by suspending the contact pads on studs of conducting material, further enabling surface areas "less than about 20 μm" and of "about 10 μm." (Published Application, Publication Number 2003/0165034, Paragraph [0036]). Paragraph 36 further states that as the size of contact pads is reduced, the parasitic capacitance coupling between the contact pads and other elements is also reduced, enabling contact pads of increasingly reduced sizes.

Clearly Claims 15 and 22, when considered as a whole, as required by MPEP § 2164.08, do not encompass contact pads having a surface area of zero, which means no surface area at all. Because the limitation of a "contact pad" is clearly included in the plain language of Claims 15 and 22, the contact pad clearly must exist, having a surface area greater than zero, to fall within the scope of the claims. Paragraph 36 of the Specification clearly reasonably enables the scope of the range found in Claims 15 and 22, enabling a contact pad having a surface area less than about 20 μm. Appellants respectfully submit that it is not reasonable to include the nonexistent group of contact pads having a surface area of zero within the scope of the range, for such nonexistent contact pads would have no pad to contact. Appellants further submit that even if the miniscule range of surface areas at and approaching 0 μm were considered within the scope of the range, that the Specification clearly provides at least "reasonable enablement of the scope of the range" as required by MPEP § 2164.08.

For the reasons cited above, the Appellants' Specification clearly at least reasonably enables one skilled in the art to make and/or use the invention of Claims 15 and 22. Accordingly, the Office Action fails to establish a case of lack of enablement of Claims 15 and 22. Given that the Specification enables Claims 15 and 22, Appellant respectfully submits that

Claims 15 and 22 are allowable under 35 U.S.C. § 112. Consequently, Appellant requests that the rejection of Claims 15 and 22 under 35 U.S.C. § 112 be withdrawn.

SUMMARY

In view of the foregoing, Claims 1-25 on appeal have been improperly rejected because the Examiner has not properly established a *prima facie* case of anticipation, a *prima facie* case of obviousness, or a case of lack of enablement. Appellants submit that the foregoing arguments establish the novelty, non-obviousness, and enablement of the claims over the cited references. Therefore, Appellants respectfully request reversal of the Examiner's rejections under 35 U.S.C. §§ 102(b), 103(a), and 112. Furthermore, Appellants request allowance of pending Claims 1-25.

Respectfully submitted,

Date: August 11, 2008

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8. CLAIM APPENDIX

The claims involved in the appeal, namely Claims 1-25, are listed below.

1. A magnetic head comprising:

an electrical contact pad;

a substrate on which the magnetic head is formed;

an insulating undercoat interposed between the pad and the substrate; and

a material selected to have a low dielectric constant interposed between the pad and the insulating undercoat.

2. The magnetic head of claim 1, wherein the low dielectric material is configured to decrease the parasitic capacitance of the magnetic head.

3. The magnetic head of claim 1, further comprising a stud formed through the low dielectric material.

4. The magnetic head of claim 3, wherein the stud comprises Cu.

5. The magnetic head of claim 3, wherein the stud comprises a conductive material.

6. The magnetic head of claim 1, wherein the low dielectric material comprises hard-bake photo resist.

7. The magnetic head of claim 1, wherein the low dielectric material comprises SiO_2.

8. The magnetic head of claim 1, wherein the low dielectric material has a thickness in a range of between about 1 μm and about 100 μm.

9. The magnetic head of claim 1, wherein the low dielectric material has a thickness in a range of between about 10 μm and about 50 μm.

10. The magnetic head of claim 1, wherein the low dielectric material has a thickness of about 20 μm.

11. The magnetic head of claim 1, wherein the low dielectric material has a dielectric constant of less than about 9.

12. The magnetic head of claim 1, wherein the low dielectric material has a dielectric constant of about 3.

13. The magnetic head of claim 1, wherein the magnetic head carries a GMR sensor.

14. The magnetic head of claim 1, wherein the low dielectric material provides a platform for the electrical contact pad.

15. The magnetic head of claim 1, Further comprising an electrical contact pad having a surface area of less than about 20 μm in order to reduce capacitance coupling with the substrate.

16. A reduced capacitance magnetic head comprising:

an electrical contact pad;

a substrate on which the magnetic head is formed;

an insulating layer formed over the substrate;

a low dielectric material interposed between the pad and the substrate which is used as a platform for the electrical contact pad to increase the distance between the substrate and the electrical contact pad, the low dielectric material comprising hard bake photo resist and having a thickness of about 20 μm and a dielectric constant of about 3; and

a conducting stud formed through the low dielectric material to make electrical connection between the electrical contact pad and the insulating layer.

17. A disk drive system, comprising:

a reduced capacitance magnetic head comprising:

an electrical contact pad;

a substrate on which the magnetic head is formed;

an insulating undercoat interposed between the pad and the substrate;

a material selected to have a low dielectric constant interposed between the pad and the insulating undercoat; and

a magnetic recording disk;

a spin-valve sensor for reading data recorded on the recording disk; and

an actuator for moving the spin valve sensor across the magnetic recording disk in order for the spin-valve sensor to access different magnetically recorded data on the magnetic recording disk; and

a detector electrically coupled to the spin-valve sensor and configured to detect changes in resistance of the sensor caused by rotation of the magnetization of the sensing layer relative to the fixed magnetizations of the pinned layer in response to changing magnetic fields induced by the magnetically recorded data.

18. The disk drive system of claim 17, further comprising a stud formed through the low dielectric material.

19. The disk drive system of claim 17, wherein the low dielectric material is configured to decrease the parasitic capacitance of the magnetic head.

20. The disk drive system of claim 17, wherein the low dielectric material has a thickness in a range of between about 10 μm and about 50 μm.

21. The disk drive system of claim 17, wherein the magnetic head comprises a GMR sensor.

22. A reduced capacitance magnetic head comprising:

a substrate on which the magnetic head is formed; and

a contact pad disposed above the substrate and having a surface area less than about 20 μm in order to reduce capacitance coupling with the substrate.

23. A magnetic head comprising:

a substrate on which the magnetic head is formed;

an alumina undercoat layer comprising Al_2O_3 formed over the substrate;

an electrical contact pad; and

a layer of alumina interposed between the electrical contact pad and the alumina undercoat layer.

24. A magnetic head comprising:

a substrate on which the magnetic head is formed;

an insulating undercoat layer comprising SiO2 formed over the substrate;

an electrical contact pad; and

a layer of SiO2 interposed between the electrical contact pad and the insulating undercoat layer.

25. A method of reducing capacitance in a magnetic head, comprising:

providing a substrate;

providing an insulating layer directly over the substrate;

providing a read/write head; and

providing a material selected to have a low dielectric constant between the pad and the insulating layer for isolating the read/write head from the substrate in order to reduce the capacitance coupling between the read head and the substrate.

9. EVIDENCE APPENDIX

Evidence1.pdf – is a pdf document of a web page search for the definition of the terms "dielectric constant."

Evidence2.pdf – is a pdf document of a web page search for the definition of the term "between."

Evidence3.pdf – is a pdf document of a web page describing the material properties of Alumina.

10. RELATED PROCEEDINGS APPENDIX

There is no material to be included in the Related Proceedings Appendix.